THE
VETERINARY JOURNAL

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Biography

MR. FRED BULLOCK, LL.B., F.C.I.S.

THE whole profession will unite in congratulating Mr. Fred Bullock, the popular and energetic Secretary of the Royal College of Veterinary Surgeons, on the new and well-deserved distinctions which he has recently earned in becoming a Barrister-at-Law of Gray's Inn and a Bachelor of Laws (with honours) of the University of London. For nearly 20 years Mr. Bullock has held the position of Secretary to the Royal College of Veterinary Surgeons, having previously been Chief Clerk in the Higher Educational Department of the Staffordshire County Council and Junior Inspector of Evening Commercial Schools in the County. He was, at the same time, for five years, the French master to the County Technical School, Stafford, and as a proof of his expert knowledge of this language he is the author of the History and Foundation of the Ivory Coast Colony—written in French—which has had the effect of saving from oblivion the name of the first French explorer to that region—Treich Laplene—to whose memory a few years ago a monument was erected at Grand Bassam, inscribed with the words, " Fondateur de la Colonie de la Cote d'Ivoire," a title claimed for him by Mr. Bullock. As a recognition of this work, Mr. Bullock was awarded the Tunisian Decoration of Officer of the Order of Nichan Iftikhar. In addition to his expert French, our Secretary has a good working knowledge of several other languages by which he rendered invaluable aid in connection with the Reports of the last International Veterinary Congress, held in London in 1914. He is a Fellow of the Chartered Institute of Secretaries and has con-

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tributed numerous articles to the Veterinary Press. In 1922 Mr. Bullock read a paper before the International Congress of the History of Medicine on the Mulomedicina Chironis, the earliest veterinary work known in history. As Librarian to the Royal College of Veterinary Surgeons, he has indexed up to date, and put in order, a collection of veterinary works which is second to none in this country; and he has made it possible for every member of the veterinary profession to obtain, by return of post, the loan of any book or periodical bearing on Veterinary Science published here or on the Continent.

As a further proof of his willingness to help, he has endeared himself to those members of the profession who have fallen on evil times by the kind and unostentatious manner by which he tactfully brings before each member of the profession the claims to the Victoria Benevolent Fund, to which he was elected Secretary in 1916. Although the fifth in order of those who have acted as Secretary to the Royal College of Veterinary Surgeons, it is not invidious to state that there has never been one who has given more wholehearted devotion to the cause of the veterinary profession, and the Council were fortunate in 1907 when they elected Mr. Bullock. That he may long be spared to enjoy the honours which he has recently gained is, we are sure, the wish of every member, not only of the Council, but of the whole profession.

Editorials

THE FOURTH ANNUAL CONTINENTAL "VETERINARY JOURNAL" TRIP.

THIS year the Fourth Annual VETERINARY JOURNAL Continental Trip has been arranged to proceed to Denmark, where arrangements have been made to visit the well-known Veterinary and Agricultural College at Copenhagen, certain scientific institutions, and a number of dairy and poultry farms. The party will leave London on or about September 24th or 25th, and their visit in Copenhagen will be combined with that of a number of English farmers for whom a trip has been arranged to cover the ground which was taken up by the VETERINARY JOURNAL trip of last year in Holland, in addition to this present visit to Denmark. The journey is arranged particularly for the convenience of the practitioner and will take about eight or nine days. Full particulars can be obtained on application to the Editor of the VETERINARY JOURNAL, 165, Church Street, Kensington, London, W.8.

THE VALUE OF THE "ABORTOSCOPE" IN THE PREVENTION & CONTROL OF INFECTIOUS ABORTION OF CATTLE.

THERE is no disease to which the old adage "prevention is better than cure" more aptly applies than infectious abortion of cattle: indeed, it has to be admitted that in the present light of our knowledge, when once infection has taken place, there is no specific *cure* for patients suffering from this costly and insidious malady; so that the chief object of the veterinary practitioner is to assist his clients to prevent its introduction into the herds, or take steps to eliminate it by prophylactic measures if it has gained a footing.

It is generally acknowledged that none of the many nostrums advocated in the past have proved successful in preventing abortion when once the animal has become infected; and even the old herdsman's idea of running a goat with the herd is no longer regarded by the modern stockowner as a sure preventive. Nor can it be said that the modern scientific methods of vaccination have proved entirely satisfactory. The use of the live vaccine is necessarily restricted to non-pregnant animals, as if by accident it is applied to a cow already in calf, it may give rise to the disease and so establish a focus of infection. There are some, also, who believe that when introduced into non-pregnant animals, the living organism may sometimes establish itself in the non-functional udder and remain there until the animal becomes pregnant, when it makes its way to the uterus, giving rise to abortion. Moreover, there are some who attribute sterility and other undesirable conditions to the use of the live vaccine.

Rightly or wrongly, the use of dead vaccines has been generally discredited, although it would appear that good results may follow inoculation with living organisms which, by frequent subcultivations in artificial media, have lost their pathogenic properties.

It is generally admitted by authorities in all parts of the world where this disease is prevalent that its control is a matter of considerable difficulty, and in most countries it has been found impossible to legislate against it. *It has, however, been suggested that if its presence could be detected and proved by some simple test, the prospect of successfully dealing with the disease would be considerably simplified.* Such a test is available in the agglutination test, but the technique of this test is somewhat troublesome to apply on a large scale. Briefly, it consists of securing the animal raising the jugular vein, disinfecting the site of operation, collecting blood in a sterile syringe, injecting it into a sterile bottle or tube, replacing the cork with aseptic precautions, packing up the sample and forwarding it to a veterinary laboratory

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where, if it does not arrive putrid, the agglutination test can be carried out. The operation is one whose performance upon a large number of animals occupies considerable time and becomes somewhat costly.

Recently, however, a little instrument which has been called the " Abortoscope " has been placed before the profession by Mr. Llewelyn Bevan, M.R.C.V.S., the Chief Veterinary Bacteriologist to the Government of Rhodesia, through the medium of the old established and well-known firm of Veterinary Druggists, Messes. Willows, Francis, Butler & Thompson, by means of which the agglutination test can be applied with the greatest ease and rapidity, enabling the veterinarian himself to carry out the test with accuracy and without reference to the laboratory. All that he has to do is to obtain a single drop of blood from the suspected animal's ear in a specially constructed wire loop, placing the drop in a small phial containing the special emulsion, and in eighteen hours he can himself read the result. The cost of these phials is small, leaving a good margin of fee for the practitioner ; and, moreover, the fact that he can himself perform this delicate test, enhances his reputation with his client. *The instrument is issued only to the members of the profession*, although, to tell the truth, any intelligent stockman could use it himself and obtain accurate results.

Here, then, is an opportunity for the members of our profession to take a more active part in future in the control of infectious abortion. The ways in which he could make use of the " Abortoscope " are numerous. Already many of the members of our profession are advocating the tubercle-free herd and, by the application of the tuberculin test are assisting their clients to this end. *By means of the " Abortoscope " it would be a far more easy matter to establish an abortion-free herd.* With the greatest facility a herd can be tested and reactors can be disposed of by isolation, slaughter, or other means. New arrivals can be tested before admission to the herd, and the practice of purchasing animals " subject to the test " can profitably be encouraged. Even bulls can be tested before being put to service. " Carrier " cows—perhaps the greatest of all dangers—can be detected and appropriately dealt with. In all cases of retention of the afterbirth the test can be applied. Indeed, there are a hundred and one ways in which this simple test could and should be employed.

Thus the veterinarian can now take as prominent a part in the elimination of infectious abortion as he has done in the past in the suppression of glanders, tuberculosis, and numerous other diseases.

General Articles

VETERINARY SCIENCE IN RELATION TO FOOD PRODUCTION.

By WILLIAM PHENÉ NEAL, J.P.,
*Alderman of the City of London, The Guildhall, E.C.*1.

PROBABLY never before in the previous history of Veterinary Science has there been a greater demand upon the energies and resources of the members of the Veterinary Profession than at the present time. It is probably no exaggeration to say that much of the health and welfare of the people in the near future will depend upon the success of the members of the profession, because it is a well-known fact that the civilised nations of the world are not only increasing in population, but also in their desire for a meat diet, and if supplies are to be forthcoming in sufficient quantities, it is eminently necessary that the diseases which so seriously affect the cattle population should be thoroughly understood and remedies provided. This can only be done by perseverance in research, and it is therefore hoped that the profession generally will regard this question of research as one of cardinal importance.

It is astonishing how little the people of this country consider the question of the supply of food upon which we are all so dependent. It is enough for them that they can obtain their daily supplies from the neighbouring shops, but the few people who are really concerned about the matter regard with some dismay that we are annually paying a sum exceeding 400 millions sterling for food imported across the seas, either from our own Dominions or from foreign countries. This, of course, at once demonstrates the fact that without this constant supply we should be face to face with a condition of affairs amounting practically to famine.

The food supply produced in our own country in conjunction with Ireland, amounts to about 51 per cent. of the total amount of meat, and less than 1/5th of the wheat we require for the production of bread. This therefore shows that if meat and bread were equally and regularly distributed throughout Great Britain and Ireland, we should only receive rations to the extent of half our daily supply of meat, and less than one loaf out of every five which we now consume.

If we consider the Metropolitan area with which I am more particularly concerned, and which embraces some 8 millions of people, we find that out of 465,000 tons of meat distributed last year through the Metropolitan Meat Market at Smithfield, only 16 per cent. of home-killed beef (including meat from Ireland) and 14 per cent. of

home-killed mutton was received at the market, so that to all intents and purposes the great bulk of the people were wholly dependent upon foreign imported meat.

As regards British bread stuffs. Having regard to the fact that most of the home-grown wheat is purchased locally in the provincial towns by the local millers, and distributed amongst the resident population, it is true to say that so far as the Metropolitan area is concerned, less than one loaf in 10 represents their share of British home-grown wheat.

It has been said, and with considerable truth, that home-grown food in this country is sufficient to maintain the people from Friday night until Monday morning, and that from Monday morning until the following Friday night they must be wholly dependent upon the imports of meat and bread stuffs.

Had the late general strike been successful, and the clearing of the ships in the Port of London stayed, in a very few days there would have been a shortage of food supply which would have been severely felt, especially by the poorer classes.

It is possible that in the future a general strike may be successful. It is also possible that we may again have to face a great European war. If so, the weapons of destruction are such that it would be well-nigh impossible to guarantee the safe convoy of food ships across the Atlantic by reason of attacks from submarines, aeroplanes, sea-planes and dirigible torpedoes. It is consequently surely incumbent upon whatever Government is in power to take such steps as are necessary in order to increase the home-grown food supply, and it has been computed that under fairly favourable circumstances we might increase our home-grown meat supply to 75 per cent. of our actual requirements and 50 per cent. of our bread stuffs. Although we should then be face to face with a shortage, nevertheless we should have sufficient at home to prevent starvation, a partial although very necessary insurance.

In discussing this matter some time ago with one of our responsible statesmen, he said that the country in the case of war would have to rely principally upon the supply of home-grown potatoes and pork. If this really is the view of those responsible for our government, the people, as a whole, should be made to clearly realise the danger of the position, as they would then, I think, require such steps to be taken as might be necessary to ensure as far as possible such a supply of home-grown food as would at all events prevent actual famine.

In viewing this matter as it at present stands, and taking into consideration the fact that if we compare the supply of cattle and sheep with 70 years ago, we find that the total head of cattle has

increased by less than 3 millions (and these are principally milch cows for dairy purposes), and that the number of sheep have decreased by several millions, although they have slightly increased in the last year or so, though not sufficiently to make up the difference in number by some millions as compared with 70 years ago. Since that time the production of live cattle and sheep has by no means kept pace with the enormous growth of population during that period.

It would seem that, in view of the necessity for increasing our cattle in this country, every effort should be made by our Veterinary scientists (by research and otherwise) to successfully combat the scourge of tuberculosis, as well as anthrax, foot and mouth disease, and other diseases to which cattle and sheep are now subject.

Here we are brought face to face with a condition of affairs which is, in fact, more serious than even foot and mouth disease, because the latter is curable, while tuberculosis is an insidious and incurable disease as at present understood.

Recently an order has been made with a view to eliminating from the dairy herds the cows most affected, and compensation is offered for those cows which under the order of the local authority are slaughtered, but before such cows are discovered to be suffering from the disease, they have been mixing with the other members of the herd, and consequently have left behind them germs of the disease which in due course develop.

Science has shown that there are certain methods by means of which it can be ascertained with practical certainty whether any animal is affected by tuberculosis. There is the Subcutaneous test, the eye test, and the Intradermal test; and of the three the last named seems now to be recognised as the most reliable, and one or other of these tests is in certain dairies applied half-yearly; such cows as react being withdrawn from the herd, and others substituted which have not reacted to the test applied immediately prior to their introduction. These herds are for the most part described as free from tuberculosis, but if this course is to be continued indefinitely half-year by half-year, it seems that the term is not scientifically applied. *The only real method of eliminating the disease from the cow stock of the country would be to test every cow used for the production of milk for human consumption at stated periods throughout the year, and to slaughter those that react.*

At the present time no Government dare issue such an order, because it would mean that nearly 50 per cent. of the cow stock of the country would have to be withdrawn, and that would result in a milk famine.

I remember some years ago that Mr. De Vine, the well-known Veterinary Adviser of the City of Birmingham, stating that he had tested by the Subcutaneous Test 680 cows from which part of the milk supply of Birmingham was drawn. Of these 38·2 immediately reacted, and I think 10 per cent. were marked as doubtful. If this 10 per cent. had been tested by the modern method of the Intradermal Test, there would be little doubt that the 10 per cent. would have gone over to the 38·2 per cent., so that we should then have had 48·2 per cent. of reactors.

Mr. Parker, equally well-known at Newcastle-upon-Tyne, stated at one of our conferences (I think at Hull), that in Newcastle there was an institution carried on for the purpose of the upbringing of children, and to this there was attached a dairy carried on under his direction. His practice was never to sell any cow alive, but when he had finished with her, to send her to the slaughter house, and then after slaughter he himself went and examined the carcase. On every occasion he had found evidence, sometimes slight, of the existence of tuberculosis.

It is well known that Lord Astor for a period of about five years endeavoured to create a herd absolutely free from disease, but ultimately abandoned the idea.

It will thus be seen that the disease which extends from John o'Groats to Land's End is deeply-rooted in the country, and only by continued scientific research are we ever likely to discover a cure.

The agitation for a clean and pure milk supply is, I think, tending in the direction of pasteurisation, but if it should ever come about that pasteurisation of all milk intended for human consumption is ordered by the Government, the dairy farmer will immediately be faced by competition from the Continent.

Milk from the Continent could be easily pasteurised and sent over by the Ferry from Zebrugge to Parkeston and distributed to various parts of the Kingdom in a comparatively short time. If this was done, enormous injury would result to the dairy trade here, and thus it becomes more and more necessary to devote the energies of our Veterinary Scientists to discover some means of either arresting the disease or entirely curing it.

It has been suggested that in the interests of all concerned, the embargo imposed by the Ministry of Agriculture upon the importation of heifers from Canada should be removed on the condition that such heifers were tested in Canada prior to emigration and certified by the proper Government officials that they were sent forward free from disease. On arrival at this country they could be mated with pedigree bulls that had been previously tested and certified to be free from

disease, and thus it might be possible to begin to found new herds of stronger constitutions and less liable to be affected. There would be the additional advantage that by the importation of these heifers we should be enabled to increase the number of calves which could be reared as steers and then killed for meat.

This is a question which must come to the front before long, inasmuch as the supply of live cattle from Ireland seems inevitably to be a diminishing quantity. Hitherto we have relied upon Irish store cattle, but owing to the conditions which now prevail in the Free State, it is, I think, the general opinion of those who really know the circumstances of the case, that we are likely to obtain a smaller number of cattle each year.

The yearly conferences of the Sanitary Institute upon these questions of disease and milk supply have already, I think, been productive of very considerable good, and I am hopeful that at an autumn or winter session of this year this matter can be further pursued at a special conference to be convened under the direction of the Royal Sanitary Institute, either in London or in one of the great provincial centres. It is a matter in which I am greatly interested, having regard to the fact that for upwards of 33 years I have been intimately connected with the management of the great markets belonging to the City of London. It was therefore with much pleasure (although with no little diffidence) that, as a layman, I accepted the invitation of the Council to preside at the Veterinary Section of the Jubilee Conference this year, but I am glad to know that with the very able assistance of the recording secretary, Mr. James R. Hayhurst, and the good will of my friends in the Veterinary Profession, and also in that of the public health, we together secured an undoubted success.

THE THERAPEUTIC EFFECTS OF ULTRA-VIOLET RADIATION AND HIGH FREQUENCY CURRENTS IN ANIMALS.*

By E. MIDDLETON PERRY, C.B.E., F.R.C.V.S., *Wimbledon, S.W.*

I WILL only state the experience I have gathered in treating a few cases by this method and note any point which I think would tend to differ from the application of the treatment to the human subject.

I use the quartz mercury vapour lamp, which has acted most satisfactorily, and seems to be the most suitable for our work. I chose the standard in preference to the hanging type, as it is more convenient to use.

* We are indebted to the Royal Society of Medicine for permission to publish this paper, which was read before the Comparative Section during the present Session.

The treatment of our patients is more difficult than in the case of the human subject.

(1) *The Coat of the Animal.*—This mitigates largely against the use of the treatment, for the owner may object to the hair being clipped. In many cases I have therefore not clipped the hair but have rubbed it up to enable the rays to penetrate to the skin. The rays can be, and are, applied to the abdomen and thighs where the hair is less thick, but this cannot be so good as irradiating the back and chest.

(2) *The Great Variations in the Thickness of the Patients' Skins.*—These are so great that they must be taken into consideration individually when estimating the amount of exposure which is to be given. My experience has been that it is most difficult to get even the first degree of erythema on the back of a dog, except those of the delicate toy breeds; even twenty minutes' exposure at 12 in. failed to produce change visible to the naked eye on the skin of a Great Dane.

(3) *The Question of Keeping the Patient at a Certain Distance from the Lamp.*—Our patients are usually extrordinarily good, but naturally they get wearied by being held in one position for some ten minutes with their eyes bandaged or covered.

At present my experience is that great use can be made of ultra-violet radiation in certain cases that either fail to respond to the usual medicaments applied, or do so very tardily. Many which respond to the use of drugs or to surgical means appear to be cured more quickly by the rays, and it is undoubtedly a pleasant and clean way of treating some skin diseases. The results in rickets are the same as in man.

A seven months old Airedale, whose front legs were bent, joints very enlarged and misshapen, improved to such an extent after twelve applications, covering a period of four weeks only, that the owner is now getting him ready for exhibition, and he certainly has a very fair chance of winning in a small show.

Such cases as moist eczema respond quickly, even two applications making a very marked change—this is also the case with indolent wounds and ulcers which seem to take on a healthy appearance almost immediately.

This is illustrated by the case of a cat which was suffering from one of those horrible, almost gangrenous wounds (about $2\frac{1}{2}$ in. long and $\frac{3}{4}$ in. broad) of the tail with which all the veterinary profession are well acquainted and know of the difficulty in healing them. After six applications of the rays the wound was quite healed.

There seems to be a great stimulus to the growth of the hair by this treatment and I think most of the patients I have treated have improved very markedly in the coat, this being probably due, of course, to the general improvement in health.

Several cases of pneumonia have been treated with most satisfactory results, also cases of catarrhal distemper.

I have tried this form of treatment in several cases of chorea and found marked improvement, but again, the good result has been probably due to improvement in the general health more than to any alteration in the nerve centres ; it would seem that ultra-violet radiation has a marked effect in tuning up the system.

A few applications after any debilitating disease seem to produce a wonderful effect on the patient and brings the case to a satisfactory conclusion.

With regard to follicular mange I regret that I have not had the success I had hoped for in its treatment by this method. I have tried it in several cases. The first few applications appeared to promise good results but subsequent exposures failed to bring about the hoped-for-cure.

It is stated that the ultra-violet rays can kill bacteria in normal tissue to a depth of one millimetre in five minutes, but the rays are not penetrative enough to reach the follicular mange parasite, perhaps on account of the thickness of the skin ; or is it that the parasites are surrounded by a protective covering of pus or other matter which is impermeable to the rays ? or perhaps I have produced a protective covering of horny epithelium by too frequent irradition. I should be glad of enlightenment on this point, and any suggestion how to overcome the difficulty. If this parasite could be reached it would be quickly destroyed by the rays ; the question is, how to reach it.

High Frequency Treatment as applied to Animals.

This treatment is quite distinct from ultra-violet radiation although it is often called the " violet ray " treatment by unscientific people. I believe various properties have been attributed to these rays, but these are now considered to be more theoretical than practical. We can therefore assume that high frequency treatment is the application of an electrical current alone. As the name implies, the alternations are of a very high frequency—" frequency " being the number of complete cycles occurring in one second of time, and as this, in some apparatus, is estimated in millions, it is appropriately named.

This high frequency renders the treatment eminently suitable for our patients, as the alternations are so rapid they do not stimulate the

sensory nerves and consequently do not produce muscular contractions. These contractions disappear at a frequency of about 10,000; for this reason our patients do not object to the treatment in the least, providing the electrode is placed on the skin before the current is turned on; even if this is not done it is very rarely that any resentment is shown and no restraint other than just steadying the animal is needed.

Constitutional Effects of the Treatment.

These are derived through auto-condensation and auto-conduction. The current increases bodily heat, to which the beneficial effect of these currents is attributed.

A form ot cellular massage is also considered to participate; this can be understood when one considers the negative and positive wave-like currents which are passing through the tissues.

However, the general constitutional effects, according to Eberhart, are classed as follows:—

(1) Increased general metabolism
(2) ,, glandular activity.
(3) ,, temperature and bodily heat.
(4) ,, oxidation and hæmoglobin.
(5) Increased secretions.
(6) ,, eliminations.
(7) Lower blood-pressure when high-tension exists.
(8) Soothing to the nervous system.

There are various forms of apparatus on the market and the primary current used is an alternating one, which can be obtained from most main supplies. It is applied to the patient by means of the electrodes already mentioned, which are made in various forms to suit every requirement.

Last month a report of twelve cases treated by this method was published in THE VETERINARY JOURNAL: the following is a brief summary.

Eight cases of paralysis completely recovered; in one case of paralysis of the tongue there was great improvement when the owner left my neighbourhood.

One case of paralysis of the hind quarters, in which the animal was eventually destroyed on account of its age, viz., 14 years; it had, however, improved to such an extent that it could stand if put on its hind legs. In one case of chorea, that of a puppy quite unable to stand, the animal was eventually able to follow the owner about the house, but could not get upstairs; in one case of old standing opacity of the cornea this has been largely dispersed.

The following additional cases have since been treated:—

(1) Pekingese, with partial paralysis of the hind quarters; could get up, but only with considerable effort, would walk a few steps and then topple over; it was completely cured after seven applications

and could run round my consulting room, which has a linoleum covered floor.

(2) Fox-terrier, with partial paralysis, is now quite cured after twelve applications.

(3) Alsatian, aged seven months, completely paralysed hind quarters with loss of control of bowels and bladder following distemper. Has had six applications and can walk and just run, if steadied a little by holding the tail.

(4) Pekingese, aged 10 years, completely paralysed in the hind quarters, was able to stand and walk a few yards after six applications, and now after the eleventh application can run quite well but is still a little unsteady.

I am also trying two cases of amaurosis, both following distemper, but I am afraid I shall have to report failures. The owner of one of the dogs is satisfied that there is improvement in the sight but I cannot appreciate it. The iris in each case remains widely dilated and I cannot get movement by any means.

In addition to these particular cases, I have mentioned there is evidence of a great beneficial effect on the animals generally, and many owners have specially remarked on the general improvement. Even after the first application the dog is brighter and better in himself, and after a few treatments the benefit is appreciable in the appearance of his coat. The current has a wonderful effect of breaking down old epithelium and producing in the skin a soft flaccid feeling which is so indicative of good health ; the coat takes on fresh lustre, which is particularly appreciated in the long hair breeds.

THE X-RAY DIAGNOSIS OF ANIMAL PARASITES (HELMINTHS) IN MAN.*

BY J. F. BRAILSFORD, M.B.,
Birmingham.

THE possibility of X-ray diagnosis depends on the calcification of the parasites or their location in the body.

Most of the encysted embryos undergo calcification ; this may follow as the sequel to the death of the parasite, or as some authorities believe it to be, a protective reaction of the tissues of the host with the subsequent death and calcification of the parasite, living embryos having been found in cysts, the outer walls of which showed calcification. Leuckart says that incipient calcification can be detected in *Trichina* in six months, but that it takes fifteen to sixteen months for

* We are indebted to the Royal Society of Medicine for permission to publish this paper which was read before the Electro-Therapeutic Section.

complete impregnation of the parasite with lime salts. X-rays are therefore not of much value in the early days of infestation unless the parasite is situated in the lung-fields.

The presence of the calcified parasites does not exclude the presence of the living parasites. One has seen echinococcal cysts calcified to the hardness of stone, existing in the liver with cysts containing living scolices. This may be due to a further more recent infestation.

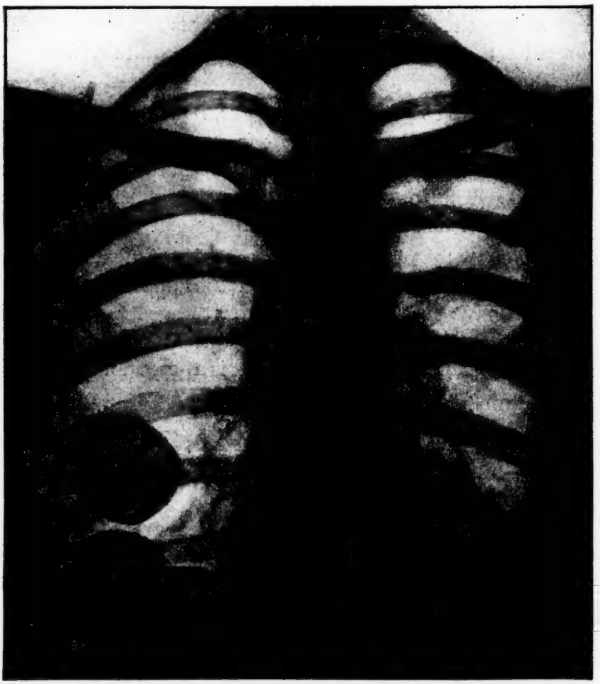

FIG. 1.—Hydatid cysts of lung.

Calcification may occur primarily in the parasite itself, in the cyst-wall, or in the reactive sheath of the host's tissues.

When the parasite is located in the lung as in echinococcal cysts, their relative density permits of an early diagnosis.

In bone, where active absorption takes place with the development of the parasite, the radiograph will detect changes in the early stages, but the diagnosis will not be easy.

The chief parasitic conditions detected by X-rays are echinococcal cysts and the cysts of *Cysticercus cellulosæ*, but the X-ray appearance of conditions such as calcified *Trichina*, *Paragonimus westermanii*, onchocerci, *Ascaris lumbricoides* and *Bilharzia* have been described.

Hydatid Cysts.—This term is usually applied to the cysts of *Tænia echinococcus*, which are much the commonest of the parasitic cysts occurring in man in this country. There is no tissue in the body in which these cysts have not been found, and the appearance of abnor-

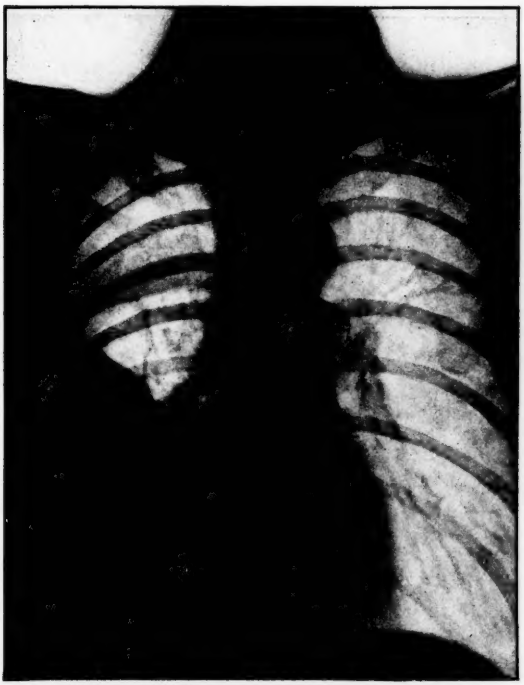

FIG. 2.—Hydatid cysts of lung and liver (infection from tame fox).

mal shadows of rounded or irregular structure with evidence of partial or complete calcification, should lead one to consider hydatid cysts in the differential diagnosis.

There are two species of this parasite. In one, the commonest, the cysts are single. In the other, the cysts form a honeycomb structure separated from one another by fibrous walls—the so-called *Echinococcus multilocularis*.

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Taking the averages of many workers, the distribution of echinococcal cysts is as follows :—Liver, 65 per cent. ; lungs, 10 per cent. ; kidneys, 7 per cent. ; other abdominal organs, 8 per cent. ; cranial cavity, 7 per cent. ; bones, 2 per cent. ; other organs, 1 per cent.

In all these sites they may be detected in the radiograph if the cysts have undergone calcification. The density of the shadows cast depends upon the stage of calcification. When completely calcified the shadows are denser than those cast by bone. They may

FIG. 3.—Old pyelonephrosis resembling calcified hydatid cysts.

be spherical or very irregular in outline ; the spherical calcified cyst-walls frequently contain daughter-cysts and scolices. In one of the cases on which I saw the post-mortem made, the patient had a large calcified hydatid cyst situated against the posterior wall of the bladder through which daughter-cysts had escaped into the bladder and been detected in the urine. The calcified cyst-wall in this case was $\frac{1}{8}$ in. thick.

But it is usually the cysts which are located in the lung-field which are diagnosed by X-ray (fig. 1). These are often found as a result of a radioscopic examination of a patient who has had an hæmoptysis and tuberculosis is suspected; but they may be detected quite accidentally while screening a patient who has given no sign of pulmonary disease. In the latter case, the cysts, the contained fluid being under pressure, appear as isolated spherical shadows of uniform density with sharp, regular borders, varying in size from that of a pea

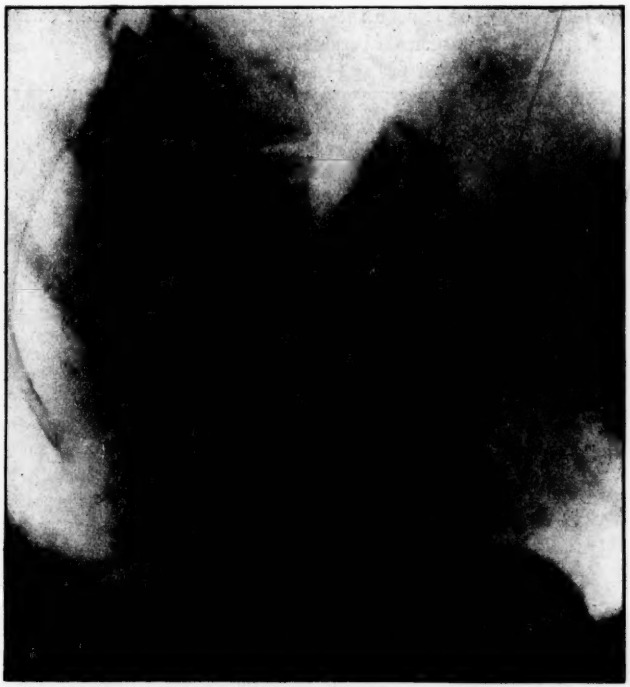

FIG. 4.—Old pyelonephrosis resembling calcified hydatid cysts. Lateral radiograph.

to that of a large orange surrounded by normal lung-tissue. With such a picture there is no other pathological condition for which they could be mistaken. If situated in the mid-line or against the walls of the thorax the X-ray diagnosis cannot be so certain. In the cases of cysts which have caused symptoms the X-ray diagnosis may be certain if the symptoms are caused by pressure from a large free cyst or if other isolated cysts are present, but the diagnosis may be obscured by

reactive changes in the tissues around, or by collapse of the involved lung owing to pressure on the bronchus.

If the cyst is pressing against a bone the latter may be completely absorbed and spontaneous fractures may occur. This has been seen in cysts located in the thorax where the ribs and spinal column and vertebræ have been destroyed. Wherever the cyst is located it tends to assume, owing to its internal pressure, a spherical appearance—a feature which should help one to distinguish it from localized abscesses or fluid collections. The patient may have coughed up daughter cysts, or scolices, or expectoration which was bile stained owing to the bursting of a cyst into a bronchus.

FIG. 5.—*Cysticercus cellulosæ* in buttocks and thighs.

All the radiographic evidence may be a raising of the affected side of the diaphragm, usually the right, with, perhaps, fixation by adhesions. In those cases in which clinical evidence suggests a ruptured cyst of the liver emptied by way of the bronchus the injection of lipiodol may be of service. In doubtful cases the diagnosis must rest upon the finding of scolices, differential blood-count, complement fixation, &c.

The artificial puncture of the cyst may cause serious symptoms from anaphylaxis, urticaria or secondary infestation, but it has been used with success for the destruction of the cyst. Where the cysts are located in the liver one may see a raising of one side of the diaphragm, or a local spherical protuberance may be seen through the

right lung base. Cysts in the liver and other abdominal organs may be demonstrated by the peritoneal method.

In the bone the cysts present the appearance on the radiographs not unlike that of a myeloid sarcoma, as can be seen from the illustrations in Bauer's article on "Echinococcus of the Tibia." The first evidence of this pressure may be a spontaneous fracture of the bone invaded. I have not met with any human bone cyst which, on examination, has proved to be echinococcal. As regards the frequency

FIG. 6.—*Cysticercus cellulosæ* in leg.

in bone, Gangolphe found 52 cases with cysts in the bones in 3,000 cases, while Alexinsky found 37 cases with cysts in the bones in 1,950 cases; in 75.21 per cent of his cases there were cysts in the abdomen.

This parasite is much more common in this country than is usually supposed. While investigating pathological conditions in food animals for a period of years before the war one saw organs of sheep, cattle, and pigs infested with it every day. In cattle it was no unusual

sight to see livers which weighed over 200 lb. due to extensive infestation with hydatid cysts, the normal weight being about 16 lb. The lungs of sheep may be so involved that the cysts appear to be separated by very little normal tissue.

In 1921 I investigated 11 cases in man which occurred in Birmingham. In six of these cases the cysts were in the liver; in one, the cyst, as already described, was against the bladder; in another, the kidney was almost destroyed by a large collection of cysts, some partly

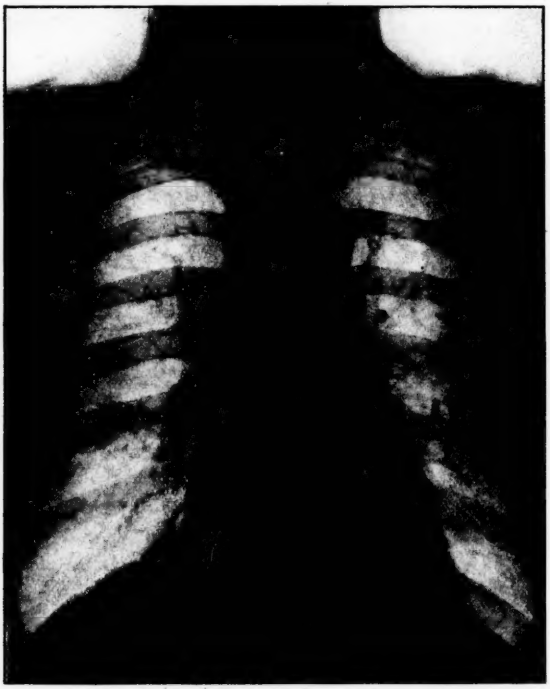

FIG. 7.—*Cysticercus cellulosæ* in thorax.

calcified; in another there was a calcified cyst of the spleen and the omentum: in another there was a cyst of the lung, while in the remaining case the cyst was located in the buttock. In all these cases a definite history was obtained of very close association with a pet dog, but I was unable to examine any of the dogs for the presence of the adult worm.

On pointing out the frequency of the disease to Sir John Robertson, Medical Officer of Health for Birmingham, it was arranged that I should make *post-mortem* examinations on 100 dogs to see what percentage of town dogs harboured the parasite. The alimentary canal of each dog was opened throughout its whole length, but in no case was *Tænia echinococcus* found, though 65 of them were harbouring other species of tapeworm.

The only three specimens of intestine bearing *Tænia echinococcus* which I have seen have been taken from foxes, and in a patient whom I recently X-rayed for echinococcal cysts of the lungs and liver there was a history of the patient keeping in the house a fox which she had trained to take chocolate from her mouth (fig. 2). These facts lead me to think that the fox plays a greater part than is usually supposed

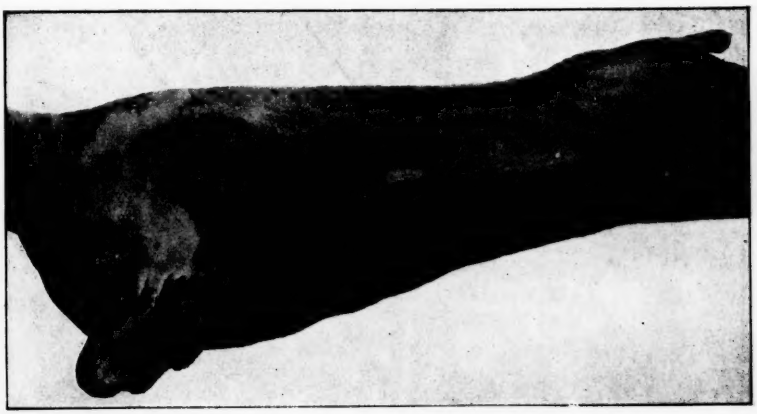

FIG. 8.—Sarcosporidia in sheep

in the dissemination of this parasite, particularly among food animals. The fox is probably infected by eating slaughter-house refuse which is sometimes spread over fields for manure, or by eating infested lambs.

Radiographically, the differential diagnosis of hydatid cysts is as follows:—(*a*) *In the Thorax:* (1) Aneurism of the heart, aorta, or its main branches; (2) Sarcomata and secondary tumours; (3) Mediastinal glandular enlargements; (4) Localized empyemata or abscesses; (5) Caries of the spine with abscesses; (6) Dermoid cysts. (*b*) *In the Abdomen:* (1) Calcified glands; (2) Calcified tumours; (3) Calcified inflammatory lesions; (4) Calculi; (5) Dermoid cysts. (*c*) *In the Bone:* (1) Bone cysts; (2) Myeloid sarcomata.

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Cysticercus cellulosæ.—This parasite has been known for centuries. It is mentioned by Aristophanes in his comedy "The Knights." Its life history was demonstrated by Küchenmeister in 1835, and later by Humbert, Leuckart, Hollenbach and Holler.

The following facts about the development, distribution, and life-history of the parasite may be of help in the radiographic interpretation.

The adult parasite, *Tænia solium*, lives in the intestines of man. It is a rare parasite in this country; the common tapeworm being *Tænia saginata*. The ripe proglottides of the parasite, containing 30,000 ova in each, are passed with the fæces. The ova are liberated during the attractions of the segments, or later by decomposition.

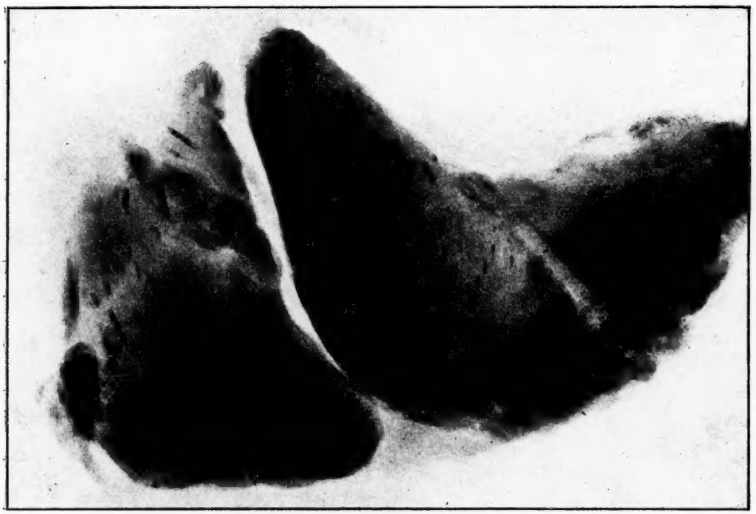

FIG. 9.—Radiograph of Sarcosporidia in pork.

If they obtain access to water supply or vegetables the man or animal (chiefly the pig) eating them liberates the small, six-spined embryos which obtain access to the blood-stream and are carried to all tissues of the body. Here the parasite develops into *Cysticercus cellulosæ*, which appears as a small white body about the size of a millet seed in which the head is invaginated.

The time and progress of development were investigated by Gerlach, who gives the following facts; (1) Cysticerci twenty days old; a delicate transparent vesicle of the size of a pin's head without an enveloping membrane; (2) Cysticerci forty days old; enveloping membrane still very delicate: of the size of a mustard seed or sometimes

larger; head very plain; sucking discs and a circle of hooklets, recognizable but not completely developed.

(3) Cysticerci sixty days old; enveloping membrane of the size of a pea; head projecting somewhat from the vesicle as a faint white button-like structure. Hooklets and sucking discs completely developed some difference in size. (4) Cysticerci 110 days old: all about the same size, head free from the enveloping membrane which lies invaginated into its caudal cyst. After the head is forced out the cysticerci have the form of a flask. These cysticerci are said to occur not only in man, but in the pig, dog, rat, cat and apes.

Man is infested with the adult parasite when he eats *Cysticercus cellulosæ* in "measly pork" imperfectly cooked. The rarity of the adult parasite in this country is probably due to the custom of well cooking pork and the greater difficulty of the parasite in development, while the frequency of *Tænia saginata* is due to the under-cooking of veal or beef which is not usually so extensively infested as pork. It is strange that whereas one saw about four cases of *Cysticercus cellulosæ* in pork in a year and no cases of *Cysticercus bovis*, all tape-worms which have been sent to me for identification have been *Tænia saginata*.

Radiographically, *Cysticercus cellulosæ* has been described in human muscles by Sick, Geipel, Fisher, Stieder, Pursche, Pichler, Köhler, and Saupe.

In some of these reported cases cysts were first found at post-mortems and X-ray examinations were then made of portions of muscle as in the case reported by Geipel. In others, the diagnosis of *Cysticercus cellulosæ* was accidently made while examining radigraphs of fractures. In one or two cases the patient was X-rayed to determine the nature of small hard nodules to be felt under the skin. In the case reported by Köhler, the patient was suffering with sciatica and rheumatic-like pains, and was radiographed to see if any cause could be found. The radiograph showed small, oval homogeneous shadows, seven to 12 mm. long and 2 to 4 mm. broad, ten to twelve in number, in the soft parts of the knee and calf, two or three in the loins, which appeared to lie in the direction of the muscle fibres. An excised cyst was found, microscopically, to be *Cysticercus cellulosæ*.

Geipel counted 198 shadows in the thigh in his case at post-mortem; these varied in size from that of a pin's head to 2 cm. in diameter. No microscopic report was given.

I have had two cases. The first occurred in a pensioner with a fracture of the humerus. The radiograph showed in addition about six shadows which I considered to be *Cysticercus cellulosæ*, but I was unable to get further pictures in confirmation of this.

The second patient, an old soldier, complained of rheumatic-like pains in his hips and legs ; he had been previously radiographed and nothing abnormal reported. On first looking at the radiograph of his hip-joint, it gave me the impression that some splashes of water had been made on the film when it was drying, and, but for my interest in animal parasites, I am afraid I should have left it at that. On closer examination I was convinced that the shadows were of calcified cysticerci, and in order to determine the distribution of the parasite I took radiographs of his whole body. These radiographs I have brought for your inspection to-night.

The cysts are shown as oval bodies of about the same size, 4 mm. broad by 8 mm. long, lying in the direction of the muscle fibres. Their Distribution (figs. 5, 6, 7) is as follows :—Thigh, 90 ; calves, 66 ; pelvis, 56 ; thorax, 20 ; neck, 10 ; loin, 7 ; upper arm, 8 ; forearm, 5 ; hand, 2 ; head, 2 ; face, 3.

No cysts are to be seen in the brain of this patient. This may be due to the lack of calcification. Cysts in the brain are usually spherical and larger than those in the muscle.

This distribution is quite different from that seen in the pig, in which animal cysts occur chiefly in the abdominal muscles, diaphragm, lumbar muscles, tongue, heart, muscles of mastication, cervical muscles, and brain, but seldom in the viscera. In 400 " measly " pigs examined by Prettner only two showed cysticerci in the eye.

In man, among eighty-seven cases, Dressel found cysticerci in the brain in seventy-two and in only thirteen cases in the muscles. Von Graefe found cysticerci in the eye in ninety out of 80,000 patients examined for eye disease.

Vosgien gives the following distribution observed in 807 cases of *Cysticercus cellulosæ* :—Eye and annexes, 370, 46 per cent. ; nervous system, 330, 40.99 per cent. ; skin and cellular tissues, 51, 6.32 per cent. ; muscles, 28, 3.47 per cent. ; other organs, 26, 3.22 per cent.

The patient whose radiographs I have shown you said that he had never had a tapeworm. He went through the South African War, and I think it very possible that he picked up his infection there, for, owing to the plague of flies which swarmed in the larders, orders were given for lime to be scattered over the fæces in the latrines. Later, the food in the larders became so scattered with lime from the flies' legs as to be uneatable. Further, water trenches in the dry season were used as latrines ; these would supply the parasite with the most favourable conditions for completing its life history. Nicol has proved that flies can carry the ova of parasites on their legs. Of the other cases diagnosed radiographically, in only one was there a history of

tapeworm. In 248 cases of *Cysticercus cellulosæ* examined by Volovatz only twenty-seven had tænia in the intestine.

Differential Diagnosis.

The most likely way in which the presence of *Cysticercus cellulosæ* may be missed is in attributing the shadows on the radiographs of the parasites to defects in the film caused by spots of water being splashed on the drying films. In fact the dried spots of water often seen on films resemble the shape and size of cysticerci.

This error is not likely to be committed if the cysts are very numerous, as in the films of the thigh and leg, but I am sure it is easily possible in the case of a radiograph of the pelvis in which only a few cysts are present.

In the food animals, pig, sheep (fig. 8), and cattle, calcified bodies are frequently seen. These are the calcified sarcocysts produced by the protozoa, Sarcosporidia. The radiographic picture of this condition is very similar to that of calcified cysticerci, varying from the microscopic size to that of a haricot bean.

These large sarcocysts have not been recorded in man so far as I am aware, but the illustrations in Geipel's paper on *Cysticercus cellulosæ* are almost identical with a radiograph I have made of a piece of pork (fig. 9) containing sarcocysts, and quite different from the appearance of the radiographs which I have shown and those illustrating the articles of Saupe, Sick, Stieder, and the descriptions given by Köhler and Pichler ; these bodies were proved microscopically to be calcified cysticerci. Further, Geipel does not state that the bodies shown in his radiographs were proved microscopically to be cysticerci. I have seen many cases of " measly " pork, but the cysts have always been about the same size ; as we learn from Gerlach's observations on the growth of the cysticerci, it is only in the early period of development that the cysticerci differ in size ; the mature cysticerci he found to be all about the same size. To get the appearance described by Geipel, i.e., " the shadows vary from the size of a pin's head to 2 cm.," one must either consider calcification of the parasites in the various stages of development or partial and irregular calcification of cysts, or assume that his case was one of Sarcosporidia.

Saupe mentions the following for consideration with respect to differential diagnosis :—

(1) *Cysticercus bovis.*—A parasite which has only been rarely reported in man in spite of the fact that the adult is the commonest tapeworm in man. Pichler has shown that even these may be hookless *Cysticercus cellulosæ.* (2) *Trichina spiralis.*—These parasites are

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altogether too small to be mistaken for cysticerci ; they rarely exceed 1 mm., and are usually much smaller and occur in greater numbers. (3) *Phleboliths, Small Osteomas, skin Tumours, Injected Medicaments, and Metal Fragments, and Faults.*—These can be excluded by taking a series of radiographs of the other parts of the body.

Trichina spiralis.—The first physician to investigate calcified trichina in human muscle was Hilton, who reported his findings in 1832. In 1828 Peacock gave a specimen of calcified trichina in muscle to Guy's Hospital. He did not discover the worm in its capsule. This was done in 1835 by Paget and Owen, who found the worms in the musculature of an Italian who had died of tuberculosis.

The disease trichinosis was first investigated by Zenker, who found at post-mortem the worms in the intestine of a girl, aged 19, who had been treated in the Dresden City Hospital as a case of typhoid. Virchow and Leuckart investigated the life history of the parasite by feeding some of the musculature to animals. This work was confirmed in the outbreaks of trichinosis at Hettstadt (1863), and Hedersleben, in which 500 cases occurred with 129 deaths. The disease is thought to have been brought to Europe by rats from China, where the pigs were often infested.

Calcified trichina have been found in pigs 9 to 12 months old, and can be seen in the muscle with the naked eye ; usually it is only the capsule which is calcified. Leuckart considers that it takes ten years or more before the parasite itself is calcified. Langerhans demonstrated that the worms may be alive after thirty years.

The commonest sites for these parasites are the muscles of the diaphragm, larynx, tongue, and throrax.

Radiographically, these parasites have been chiefly demonstrated in portions of muscle removed at post-mortem, but Levy-Dorn (1923) reported a case of trichinosis in which the worms were discovered in a section of an ulcer of the tongue ; he was able to obtain radiographs of the musculature which had the appearance of being dusted with meal. The individual cysts vary from 0.1 to 1 mm. He recommends the systematic radiography of the upper arm for its detection. In view of the preference of the parasite for the muscles of mastication and their occurrence in great numbers, which would tend to obscure the parasite in a thick part, I suggest that it would be preferable to take a radiograph on a dental film of part of the masseter.

I have recently tried to demonstrate the presence of trichina in a portion of the biceps of a man who died from trichinosis, but though, microscopically, the worm can be seen in great numbers, there was no trace of them on the radiograph, no calcification having taken place.

Ascaris Lumbricoides.—The round worm has been demonstrated in two cases by Otto Fritz, the worms being seen in the opaque meal.

In the light of recent work on the life history of the parasite, in which it has been shown that the embryos of the parasite pass to the liver and then to the lungs before reaching the intestine to become mature, it might be possible to demonstrate radiographic signs of the lung invasion in experimental animals.

The other helminthes found in man in this country do not produce any appearance which can be demonstrated by the X-ray except, perhaps, the *Bilharzia.* In some cases of this disease calcification of the bladder and ureter wall takes place. Lotsy has demonstrated the appearance so produced by the parasite.

Lastly, Köhler has demonstrated the radiographic appearance of infestation of the lung with *Paragonimus westermanii.*

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Clinical Articles

INTESTINAL CALCULUS.

BY H. LLEWELYN-JONES, M.R.C.V.S.,
Denbigh.

I RECORD this because of the rather unusual and misleading symptoms shown by the patient.

The subject was an aged horse, which had been in the owner's possession for nine years, and worked without any illness.

I was called in to attend to it for loss of appetite and wasting.

The symptoms shown then were: Condition fair; abdomen tucked up; the animal dull and drowsy; temperature 103° F.; pulse 51, and easily obliterated on pressure; respirations slightly accelerated; almost entire loss of appetite; the mucous membranes were "jaundiced" (a dirty red, tinged with yellow). The fæces—which appeared normal—were passed in small quantities at fairly long intervals—about three times a day; urine normal. Rectal exploration failed to disclose any abnormality.

TREATMENT.—Three gallons saline solution administered with stomach pump and followed in six hours by one and a half drachms calomel in bolus, and later one ounce of Sod. Sulph. three times

daily in drinking water. On the following day the bowels acted freely, but no large quantities of fæces passed.

There were no signs of colic, and the animal remained very much in the same condition—refused all food, and became more tucked up and listless.

Stomachic electuaries were given, but with no result.

I had told the owner that the trouble was due to some diseased condition of the liver, but would not express an opinion as to what it actually was. The case, after being under treatment for 10 days, became hopeless, and I advised destruction.

On *post-mortem* examination, one large calculus, resembling a football in size and shape, was discovered in the large intestine. It weighed 11¼ lbs. and had caused local inflammation, with a larger area of visceral and parietal peritonitis with fibrinous adhesions.

The liver was certainly paler, and a little more friable than it ought to be, but I do not think it was the cause of the trouble.

AIR EMBOLISM OR WHAT?

By CHAS. MASSON, M.R.C.V.S.,
Torquay.

The subject was a newly-calved crossbred South Devon-Guernsey cow with an obstruction in one of her teats. I adopted my usual practice, which has been highly successful in the past, namely, puncturing the membrane with a concealed papillotome and then making radiating incisions with the blade of the papillotome from the centre of puncture (like the spokes of a cartwheel). During the operation the hæmorrhage was more than I usually experience, though not great. I then proceeded to inflate the quarter with air, with the milk fever syringe, as, in my experience in the past, it not only stretches the parts but also stops any slight hæmorrhage present. While pumping I remarked to the owner that the udder seemed to be taking more air than usual, and presently the cow began to show the following symptoms: quick deep respirations, swaying and a peculiar bending of the loins as if she had partial paraflegia, or like masturbation in the male dog. She fell down and after a few deep respirations died—death occurring in about three minutes from the commencement of the symptoms.

What was the cause of death? Was it due to the air getting into a small artery and being pumped to the brain, lungs or heart, causing embolism, or what? I cannot think that it could have got into the veins, as these ought to have been occluded by the pressure.

Any theories on the subject would be helpful. Naturally, I am

somewhat sceptical to try the procedure again, but owing to having had such successful results in the past with this line of treatment it seems a pity not to continue it, especially if one could devise some means of preventing a recurrence of this unfortunate sequel.

In cases of "bloody milk" and hæmorrhage in the udder from traumatism I have found tight air inflation the best line of treatment, the pressure stopping the hæmorrhage from the arterioles, and one client of mine who once had a cow which had a "stiff quarter" down with milk fever contends that the inflation cured that quarter, and now, whenever he has a cow which is difficult to milk. he sends for me to inflate the affected quarter to stretch the teat.

PROLAPSE OF THE BOVINE UTERUS WITH AMPUTATION.

By W. W. LANG, M.R.C.V.S.,
Brigg.

The mortification of losing two cows comparatively recently from shock following inversion of the uterus set me thinking whether death could not have been avoided.

On Wednesday, August 4th, another case was reported, and on arrival complete prolapse, which had been in existence for four hours, was found to exist.

The first step was to administer sod. chloride lb. ½ in three gallons of lukewarm water per stomach tube through the nostril, this to obviate shock. All the recognised methods of reduction were tried, but without avail and at last, after a two hours' struggle, I pushed my fist through the uterine wall. Following a short consultation with the owner, whom I advised to gamble on the case, viz., £3 from the butcher v. £30 for an equally good cow, it was decided to try the latter chance and amputate.

The rubber ligature method was adopted, care being taken to ensure that the bowel was not included, but, contrary to custom, the uterus was not cut off for 38 hours—probably quite an unnecessarily long time—when this procedure was carried out without the slightest ill effect on the patient.

Slight shock was shown for a few minutes after the tying of the ligature, but this quickly passed off—the saline had been given two hours previously—and the cow has since made an excellent recovery.

The important points in the case appear to be :—

(1) Administration of salt solution to prevent shock ; probably best given at least one hour previously, but in this case two hours before.

(2) Use of a rubber ligature, recommended in Fleming's Obstetrics, rather than sutures.

(3) The lapse of time between the tying of the ligature and the actual removal of the uterus—this was advised by a veterinary writer some years ago.

PTOMAINE POISONING IN CATTLE.

By C. W. CARTWRIGHT, M.R.C.V.S.,
Dyserth.

One evening I was urgently called to a good shorthorn cow, four months calved, which was said to have come in all right at milking time, giving her usual quantity, then, one hour afterwards, was noticed ill.

I found her trembling, breathing fast, body bathed in cold perspiration, icy-cold extremities, weak fluttering pulse of 100, eyes blood-shot, dazed appearance, constant nodding of the head, tremulous jaws, causing a peculiar chattering of the teeth, and to my surprise a temperature registering only 96·5°, tested with two thermometers. Frankly I was non-plussed, unable to give the disease a name, or to assign its cause. Internal hæmorrhage was negatived by the condition of the membranes. Enquiries made as to the possibility of eating anything foreign, were strongly denied. There were no poisonous herbs about to the owner's knowledge, neither had she ever shown signs of a depraved appetite. It was evident that the cow was very ill, and that something causing the systemic disturbance was also seriously affecting the thermic and cardiac centres. This, I figured as some toxin either in the form of auto-intoxication, or having been partaken. As she was in splendid condition and had only been suddenly taken ill, I came to the conclusion that she had eaten some poisonous material, but its exact nature I was not prepared to state.

Although he could offer no better solution, the owner was rather sceptical, inasmuch as the cow had come into the shippon in perfect health, eaten her usual feed, given her normal quantity of milk, then, only an hour afterwards was found in this condition.

Plenty of warm clothing was applied, legs rubbed and bandaged, and good bed supplied.

I administered medicine which I had at hand, and considered suitable, consisting of a hypodermic injection of P.D. & Co.'s Cardiac Tonic (Strychnine, Spartein, and Digitalin) followed by 6 ozs. of Sod. Hyposulphis, 2 ozs. of ether and some whisky, and afterwards sending two bottles of medicine, one containing a formalin mixture, and the other spirits ammon. aromat., camphor, nux vomica and ether; an alternative dose to be given every 1½ hours throughout the night.

Next morning I was greeted with good news in a double sense. First the cow was decidedly better, and an examination found her general appearance much improved, pulse stronger and slower 80, body surface and extremities warm, temperature risen to 98·5°; also she was inclined to pick a little hay. She had very little milk, and was scouring, the fæces having a very offensive odour. Secondly, I was given credit for a correct diagnosis, which was not quite deserved. It appeared that a son who was not at home during my visit, had, in passing through the yard when the cattle were going in, noticed this particular cow with something strange in her mouth, and found she was chewing, and had evidently eaten a quantity of a particularly putrid piece of sheep's lungs. The remnant he rescued and threw away, thinking no more of it until he returned home late at night to be told the news and my suspicions of its cause.

I saw the piece recovered, and could scarcely credit that a cow would tackle such decomposed filth. Another purge was given and same treatment continued, at, of course, much lengthened intervals, when on the third day she seemed convalescent, having a normal pulse and temperature, and giving nearly her usual quantity of milk.

I regard the condition as due to ptomaine poisoning, as I can recall an instance in which a collie within half-an-hour of being seen to eat a putrid piece of meat, suddenly collapsed and showed somewhat similar symptoms. Here, however, the cause was known. He was given an emetic, afterwards stimulants, and soon recovered. I had this case in mind at the time, but regarded the analogy as very remote. Cattle will often eat their placentæ, usually causing digestive disturbances; at least, in the cases I have seen, probably due to the fact that decomposition had not set in.

Another case recently seen was a cow known to have eaten a mass of putrifying sheep's intestines, and at the time was freely passing long strips of same. The primary symptoms were extreme dulness, with loss of co-ordination. Although able to rise and stand, the slightest movement caused her to overbalance. This passed off in a day or so, when it was noted that the character of her respiration had suddenly changed, and now exactly simulated that of a broken-winded horse. This persisted for two or three weeks, then became normal. The milk yield had totally ceased, and it was several weeks before this completely returned, when recovery could be termed absolute.

I will not attempt to explain the different train of symptoms in either case, but venture to suggest that ptomaines, of which there are several, causing probably different actions, may account for more mysterious cases in cattle practice than are generally credited.

EXCISION OF THE VOCAL CORDS IN A DOG.

By J. V S. RUTTER, M.R.C.V.S.,
Hereford.

SUBJECT.—A 2 to 3 years old retriever dog.

HISTORY.—The owner complained that, although the animal was an excellent gundog, he had got into the habit of continuously whining when out with the gun, especially when the birds were coming over. A medical friend had told him that an operation would stop this. Could I do anything? If not, he would have the dog destroyed, as it was no use to him as it was. I informed him that I had no experience of such an operation, but if he left the dog with me I would consider the question, and do what I could.

OPERATION.—One grain of morphia was administered hypodermically, and half-an-hour later anæsthesia was completed with chloroform. The dog was fixed in the dorsal position and the skin covering the ventral surface of the larynx was shaved and disinfected. Cocaine and adrenalin hydrochlor. were injected locally. A longitudinal incision about 2 in. long was made over the larynx, through skin and muscles, until the crico-thyroid membrane was exposed. There was a certain amount of hæmorrhage—principally from the crico-thyroid artery, necessitating a ligature and severance of which seemed unavoidable. When all bleeding had ceased, an incision was made along the entire length of the crico-thyroid membrane. The edges of the incision were retracted by an assistant when, by the aid of an electric torch, the vocal cords were easily seen. Each cord was grasped in turn with a special small pair of forceps and a piece about $\frac{1}{4}$ in. long was excised from the middle of each with a small pair of scissors. After carefully swabbing with Eusol the edges of the membranous incision were drawn together with two fine sutures. The muscles were then lightly sutured, the skin wound being left open for drainage and irrigation.

Strict aseptic precautions were observed throughout the operation, and the dog made an uneventful recovery. There was little discharge from the wound—irrigation with Eusol being carried out daily for a week.

RESULT.—It is now two months since the operation was performed, and the owner informs me that the animal is in perfect health. Apparently the dog can emit a deep-noted bark when desired, but nothing approaching the high note of a whine has been heard.

REMARKS.—At first sight the operation may not appear quite "humane," but I congratulate myself that it was the means of saving the dog's life!

XUM

A CASE OF SPIROCERCA SANGUINOLENTA IN A FOXHOUND.

By MAJOR-GENERAL T. H. SYMONS,
Director-General Indian Medical Service ; late M.F.H., Madras Hunt.

This hound arrived in Madras in October, 1924, being one of a draft of 22 couple of foxhound bitches received from England for the Madras Hunt. She arrived in very good condition and carried it all through the season. I should mention that the great bugbear of the Madras Hunt is tick fever (*P. Gibsoni*), and in the fighting of this disease the Hunt staff have to devote much time and attention to the kennels. Temperatures of all hounds are taken three times a week, oftener if necessary ; every hound is deticked on returning to kennels after exercise and hunting and a daily record kept of the ticks collected. Also all the hounds are examined once a week for any signs of tick fever, paying particular attention to condition of mucous membrane and the state of the spleen.

The history of this hound during the season of 1924-25 is the following : (1) Ticks—eight in November, seven in December, three in January, 14 in February ; 32 for the whole season. (2) She was suspected of suffering from a mild " go " of tick fever in that she had an injection of ·45 gr. of novarsenobillon on January 2nd, 1925. (3) Her blood was negative. (4) Spleen shown as reaching the left nipple line on December 26th, 1924, together with a slight anæmia. She recovered all right and was sent to the hills, together with 9½ couple of others for the summer. During the hot weather she did very well, but upon returning to Madras in October, 1925, it was noticed the bitch was (1) On the thin side ; (2) Appetite capricious ; (3) Loss of energy.

Every attempt was made to arrive at a diagnosis of the condition. *P. Gibsoni* was suspected, but no signs were present—spleen was *not* palpable, very slight anæmia present, no " temperature " and blood was negative on many occasions.

Worms were drawn for, including the ankylostoma, with a negative result. Tubercle was suggested but Van Pirquet was negative, and there were no lung signs or symptoms. Very careful examination of the abdomen elicited no growth.

No diagnosis could be made and yet the hound rapidly lost flesh and showed no signs of response to any treatment. It was decided therefore to " put her down " on November 28th, so that a complete *post-mortem* could be all the better made. I attach a full and complete report which was done at the Madras Veterinary Hospital under the supervision of Mr. Ware, F.R.C.V.S. It will be seen that the condition was due to the presence of spirocerca sanguinolenta in the

œsophagus. The pouch which contained them looked very like an enlarged lymphatic gland, and in fact was mistaken for such at first.

The note on the condition of the spleen is interesting. " A cicatrice showing the remains of an old rupture in spleen. ' I have seen these cicatrices in hounds which have died from *P. Gibsoni* and have no doubt they are due to the healing of local areas of necrosis which occur so frequently in the course of the disease.

NOTES OF POST-MORTEM EXAMINATION ON THE HOUND BITCH BELONGING TO THE HUNT CLUB, MADRAS.

The hound in question was reported to have been suffering from dysentery and falling off in condition of late. She was tested with tuberculin intradermally with negative results. She was chloroformed on November 28th, 1925, at 10 a.m., and a *post-mortem* examination was held on her immediately. Before she was chloroformed she passed fæces of her own accord. The fæces, to begin with, were very sloppy and cream coloured and contained no admixture of blood. At the close of the defecation pure darkly coloured blood was voided and limited to the surface of the fæces, which indicated that the presence of blood in the fæces was due more to actual hæmorrhage from the rectum than from any other portions of the intestines.

The condition of the hound at the time of her destruction was very poor and she appeared emaciated.

On reflecting the skin, subcutaneous fat was very scanty. The subcutaneous abdominal veins were very much distended. On opening the abdominal cavity, the peritoneum was found normal in appearance. There was a deposition of peritoneal fat of about half an inch in thickness. The veins of the splanchnic area were very much distended. All the organs were found moist and in their normal position. The spleen showed the cicatrices of an old rupture of about an inch in length. The bladder was slightly distended and limited only to the pelvic cavity.

On opening the thoracic cavity, the pleura and pericardium were found normal, and nothing could be noticed in them. The heart was found considerably enlarged and flabby. Both the auricles contained fluid blood which clotted readily after its escape. Both the ventricles contained blood. Weight of the heart—10 ounces. Endocardium—nothing unusual. Coronary arteries—patent. No atheroma of the aorta.

Appearances indicative of dilatation of the heart. The lungs—both the lungs were emphysematous in patches, the left being more involved than the right. In the cardiac lobe of the right lung there

were present areas of hæmorrhagic patches due to intratracheal injection of chloroform.

The mediastinal glands were normal.

Œsophagus—showed towards its terminal thoracic portion a tumour of the size of a walnut which on section revealed 32 spirocerca sanguinolenta. Liver—2½ pounds, considerably larger than normal. Capsule distended and tightly stretched over finely darkly mottled liver substance. The capsule was thickened in places and presented white spots. On section large quantities of blood from the cut veins oozed out and the cut sections revealed typical nutmeg appearance. Gall bladder contained 10 cc. of bile. Appearances indicative of chronic passive congestion.

The spleen—weight four ounces—except for the cicatrice above mentioned, nothing unusual could be noticed.

The kidneys. Right: weight, four ounces; normal amount of fat on the surface; capsule was firmly adherent and did not strip off easily; when stripped it left a very granular surface; on section the cortex was smaller in extent than normal. Left kidney: weight, four ounces; same appearances as the right.

Appearances of both the kidneys indicative of interstitial nephritis. The intestines were carefully ligatured between the pyloric orifice and the terminal portion of the colon. Nothing unusual could be noticed on the external surface of the intestines. The intestines were then split their entire length, spread on the table and examined. The first two feet from their commencement were more reddened than normal and appeared slightly congested. In the jejunum there were small areas presenting appearances similar to those found in the duodenum. Nothing unusual could be noticed in the ileum. The colon contained sloppy creamy coloured fæces without any admixture of blood. Towards its terminal portion the mucous membrance was found very much reddened, which extended to the rectum. Sections of rectum were taken for histological examination. Scrapings of the intestinal mucosa were examined for strongyloides with negative results. The intestines were washed gently with a fine jet of water. The colon though it looked slightly redder than normal, yet presented nothing unusual. The mesenteric and colic glands did not reveal anything unusual. Smears were taken from these as well as from the mediastinal glands and were examined for acid fast organisms with negative results.

Nothing unusual could be noticed in the rest of the other examined organs.

APPEARANCES FOUND.

(1) General emaciated condition of the carcase; (2) Engorgement

of the veins of the splanchnic area; (3) Dilation of the heart; (4) Emphysema of the lungs; (5) Spirocerca sanguinolenta (32 in number) in the œsophagus lodged in a tumour; (6) Chronic passive congestion of the liver; (7) Interstitial nephritis; (8) A cicatrice showing the remains of an old rupture in the spleen; (9) Reddened appearance of the rectum indicating the dilation of the rectal veins.

OPINION.

The *post-mortem* appearances presented by the intestines did not reveal any lesions characteristic of those one usually meets with in dysentery. The picture presented by the rectum indicated that the voiding of blood in the fæces was due to hæmorrhage from the rectum brought about by the dilation of the rectal veins which might have been contributed to, to a certain extent, by the dilation of the heart the effects of which have also been manifested in the *post-mortem* appearances presented by the other organs.

The falling off in condition of the hound and that very rapidly, was probably due to the large number of spirocerca sanguinolenta found in the œsophagus assisted by the hæmorrhage from the rectum.

Hutyra and Marek in dealing with spiroptera sanguinolenta in the œsophagus observe as follows:—

In the more carefully studied cases intestinal disturbances were observed, also dry cough, dyspeptic attacks and emaciation.

SOME NOTES ON DISTEMPER.

By W. R. McKINNA, M.R.C.V.S., D.V.S.M.,
Huddersfield.

THE seasonal outbreaks and variations in the clinical appearances presented in distemper are of interest. As a rule we have found that the autumn months herald the approach of an outbreak amongst the young dogs of the districts, this gradually dying away about the end of the year to occasional sporadic cases, recrudescence of the disease in acute form appearing about March. The incidence of disease has usually fallen during the summer months, but this year the steady flow of cases from the early spring has not subsided, and the summer months have provided a large amount of clinical material.

It would be interesting if data of the seasonal incidence of distemper throughout the country could be collected.

The clinical picture presented to-day in the majority of cases shows very emphatically the absence of the so-called classical distemper syndrome. In our experience one now seldom encounters the acute febrile onset followed by profuse catarrhal inflammation of respiratory tract and conjunctiva. Such attacks of distemper,

although severe in their effects on the patient at the time, are often the most satisfactory in their response to treatment and freedom from the dreaded nervous *sequelæ*.

Instead, we have more recently "met with" the so-called "suppressed" type of the disease. The onset is gradual, and may call for but little comment from the owner. Some dullness, lack of the usual good spirits, probably vomiting may manifest themselves for a few days. The dog then appears to be returning to normal, but soon relapses into his former condition of listlessness. Following this, occasionally a slight husky cough is noticed, and quite frequently an obstinate diarrhœa. The animal's temperature is usually raised one or two degrees for some days.

Two or three weeks from the onset, one meets with such complications as bronchitis, bronchial pneumonia, with profuse purulent discharge from the nose. Their appearance is always a cause of anxiety during treatment, and are frequently a prelude to the development of the nervous phases of distemper.

Virulence of infection in respective outbreaks of this sub-acute type of the disease is very variable, and the type of symptoms exhibited accordingly modified. It is interesting to note how, sometimes, this type becomes faithfully reproduced in a sequence of cases.

Treatment of this "suppressed" form of distemper can only be symptomatic. Generally speaking the use of internal antiseptics, absolute rest during the illness, a generous light diet and good nursing are indicated. The duration of *malaise* and convalescence is often tedious.

The use of vaccines is generally contra-indicated as frequently too marked a negative phase is produced, sometimes precipitating a nervous crisis. On the other hand, vaccine therapy is exceedingly effective when severe nasal and bronchial catarrh is present.

We have found that one phase in a series of cases is the appearance of an ulcerative stomatitis. It is sudden in its onset, notice being aroused by the offensive breath. A brownish discoloration of the teeth, especially the molars, is seen, and on attempting to remove it, the margin of the gums bleed easily. Twenty-four to forty-eight hours later, definite ulceration of the buccal mucous membrane appears, accompanied by an exceedingly offensive smell. Here treatment of this condition is very satisfactory, the application to the gums of a $2\frac{1}{2}$ solution of chromic acid being followed by an immediate arrest of the trouble.

Nervous *sequelæ* towards the end of an attack appear to be exceedingly frequent, and are not often amenable to treatment. The use of luminal sodium for the control of epileptiform seizures and the

milder cases of meningitis, has been much more successful in our hands than that of bromides. In some cases the results have been very gratifying. Unfortunately, the drug appears to exert no beneficial effect in cases of chorea, contrary to expectations. Similarly, the suggested use of parathyroid extract has been disappointing in its results.

One type of distemper seen to-day might be specially mentioned, and it is that exhibited in dogs that have received vaccines as a prophylactic. The diagnosis of some of these cases is exceedingly difficult. Many of the usual symptoms and usually all catarrhal symptoms are in complete abeyance throughout the illness. Immunity against *B. bronchisepticus* has certainly been well established, but the continued frequency of fatal terminations by the onset of acute nervous crises is of common occurrence, and to us a strong point against the acceptance of Ferry's organism as the cause of distemper *per se*.

Some dogs that we have vaccinated have apparently escaped infection; others have suffered from a mild attack; many have contracted the disease with fatal nervous *sequelæ*.

Where we were once enthusiastic advisers of preventive inoculation, to-day our opinion as to its efficacy or even advisability has been considerably modified.

FURTHER CLINICAL TESTS WITH "LUMINAL" SODA (PHENYLETHYLMALONYLUREA).

By J. V. S. RUTTER, M.R.C.V.S.,
Hereford.

Case 1.—12 months old fox-hound bitch.

Symptoms.—Advanced chorea following distemper. Twitching of muscles all over body. Inco-ordination of movement. Semi-blindness and deafness. Temperature 102°.

Treatment.—A usual diet of Virol, etc., was advised, with complete quietness in a dark, cool, loose box. Medicinally I prescribed "Luminal" suspended in an emulsion, each ounce of which contained one grain of Luminal. A teaspoonful of this was administered twice daily after food—an occasional dose of liquid paraffin also being given.

Course.—Three days later I called at the Kennels and found the bitch considerably improved. The twitching had disappeared almost completely, and a much steadier gait was noticed. Sight and hearing had also improved, and she was taking food herself. A further improvement was reported next day, and then the M.F.H., returning from a holiday, was so shocked at the bitch's emaciated appearance, that he shot her on the spot!

CASE 2.—Fox-terrier dog. Age 9 months.

Symptoms.—Brought to me having just had a "fit"—the third that day. Dog was trembling, frothing at mouth, moaning and occasionally screaming. Temperature normal.

Treatment.—A luminal tablet (gr. iss.) was administered at once. Half-an-hour later dog was quiet, the frothing had ceased, but he was still trembling.

Spasms of muscles were still noticed an hour later and gr$\frac{3}{4}$ luminal was given. In an hour's time I found him semi-comatose and all trembling had ceased.

Next day the dog seemed dull, but otherwise normal. Worm medicine was given, with pronounced results two hours later. No more fits have been reported.

Did the luminal do any good in this case?

CASE 3.—Mongrel terrier dog, about four years old.

History.—Brought to me about 7.30 a.m. in the last stages of an epileptiform fit. Trembling, excessive salivation, moaning, and occasionally screaming. In between spasms he appeared semi-comatose. Owner thought dog had been poisoned, and I was inclined to the same view.

Treatment.—June 16th, 8 a.m.—Dog was placed in a cool, loose box, with plenty of straw. Apomorphine was given hypodermically, vomition occurring almost immediately. A large slab of discoloured, undigested meat and some liquid ingesta was revealed. Luminal gr. iss in tablet form was then given.

11 *a.m.*—Moaning and screaming had ceased, but tremors and frothing at mouth still evident. Dog semi-comatose. Lini Camph. B.P. 5c.c. injected subcutaneously.

2.30 *p.m.*—Dog more conscious. Salivation normal. Twitching of muscles and dog screamed when picked up. Bladder was emptied by digital pressure, and an enema caused evacuation of dark fæces. A few minutes later dog had another fit, attempting to rush round the box, but reeling and falling every few steps. Luminal gr. $\frac{3}{4}$ given. Temperature 102°.

6 *p.m.*—Dog quieter. Only slight tremors noticed, but occasional moans. Appeared very sleepy. Brandy and milk given by mouth. Hot water bottles to abdomen and spine. Temperature 102·5°.

June 17th.—Dog was more conscious, but still showed muscular tremors, and fairly frequent spasms of yelping. He was quite unable to walk properly, although he made frequent attempts to get to the door of the box. Enemata produced evacuation of blood-stained fæces. Urine also slightly tinted. Virol was given by the mouth and camphor hypodermically.

The dog had two fits during the day, and "luminal" gr. iii. was given in three doses of gr i at about four-hour intervals. Late at night the dog appeared much better, tremors had ceased, and he took a little soft food.

June 18th.—Dog better, but still unable to walk properly. Fæces and urine blood-stained. Pain in epigastric region.

½ gr. doses of "luminal" were given at 10 a.m., 4 p.m. and 10 p.m., alternated with small doses of chlorodyne. Virol and a few drops of brandy were given every few hours. Similar treatment was continued for the next two days, and the dog then returned home apparently well on the way to complete recovery.

The owner found him dead one morning about four days later from no apparent cause.

I was unable to make a P.M. examination.

THE VALUE OF LUMINAL SODA FOR EPILEPSY IN DOGS.

By W. V. EARNSHAW, M.R.C.V.S.,
Veterinary Dept., Zaria, Nigeria.

While reading the January number of the Veterinary Journal, I was greatly interested in the article on the use of luminal in canine practice.

During the years 1922 and 1923, I had opportunity to observe the effects of luminal on a friend of mine, an ex-soldier, who suffered from a form of epileptic fit, and for which no cause other than war strain could be found. Almost from the commencement of treatment the drug had a marked effect on the frequency and duration of the fits, and very soon the latter ceased. My friend continued to use the drug for over three years, but unfortunately on his ceasing to do so then, the fits reappeared.

During the summer of 1923, while still a student, I spent my vacation with Mr. Petty, M.R.C.V.S., of Cosham, Hants, and while there, decided to try the effects of luminal on dogs. Unfortunately I did not keep records of dogs treated. However, in all ordinary fits, i.e., those of a temporary nature, luminal proved very successful, and all cases treated recovered. The drug was made up in the form of tabloids of ½ grain each, and the dose used was one morning and evening, and if necessary, one at mid-day.

During the early part of 1924, I had opportunity to try luminal in two cases of chorea, with the following results :—

1. Black retriever bitch, aged 18 months. After an attack of distemper at the age of 13 months, the dog had shown a twitching of

the near forelimb. Later twitching of the near hind limb appeared, and at the time I examined the dog, a twitching movement of the body had set in. Luminal was used in dosage of ½ grain three times a day. For about a week it appeared that the twitching was less marked, but later it became as before, and the dog was eventually destroyed.

2. Collie, aged 10 months. The only symptom here was twitching of the near forelimb. Luminal in dosage of ½ grain, twice daily, was given, and later it was increased up to 2 grains a day. No change whatsoever appeared in the condition, and treatment was eventually abandoned.

In view of the above it would appear that luminal is of use in temporary cases, but not in those cases caused by definite lesions in the nervous system.

CONGENITAL MALFORMATION OF THE ANUS AND VULVA IN A KITTEN.

By HERBERT BUCKINGHAM, M.R.C.V.S.,
Norwich.

Female kitten, under three months old, said to be "bound up." I examined it and found the bowel filled with hard fæces, reaching for fully five inches in a straight line from the anal region to the diaphragm. The rectum, instead of being in a direct line to the anus, curved down into the vulva, there being a common opening for the bowel and generative organs.

The fact that the bowel made a sharp descent from where the anus should have been, prevented the exit of the fæces which became heaped up.

Twice I evacuated the bowel, absolutely, with oil internally and by mechanical means, but as seen in specimen, it filled up for the third time; owner wished it to be killed—this I did.

I have seen a large number of similar cases in small pigs and operated on many, making an incision where the anus should have been, but I never remember a successful case. That is the reason why I did not operate in this case.

I have never before seen such a case in a kitten. The patient did not seem to have any pain—it was continually purring and fed well.

A NOTE ON A CASE OF PECULIAR SURGICAL EMPHYSEMA IN THE FOWL.

By F. A. E. CREW, M.D., D.Sc., F.R.S.E.,
Animal Breeding Research Dept., The University, Edinburgh.

An adult Campine cock was thyroidectomised a year ago. The only result of this appeared to be a complete failure to moult. The

bird remained so unremarkable that it was assumed that the operation had not been complete. The neck was opened again, therefore, twelve months after the first operation, but no thyroid tissue was found. It would seem that thyroidectomy in the adult fowl is followed by no considerable disturbance. The failure to moult after thyroidectomy is of interest in view of the established fact that a sharp dose of thyroid extract evokes a most rapid and complete moult.

But the purpose of this note is to record a sequel which in my own experience is uncommon. The day following the second operation the subcutaneous tissues of the body, neck, and head were tensely

distended with air. This in itself is not remarkable for operative interference of this kind usually involves a rupturing of the walls of the various air sacs. But in this case the wattles, though not the comb, were also involved in this emphysema, being of a fierce red colour and ballooned to such an extent that the bird's appearance irresistibly reminded one of the caricatured regimental sergeant-major. Calling upon my experience, I was inclined to regard this distention of the wattles as being due to hæmorrhage, but I found that manipu-

lation emptied them, this act being associated with the escape of air into the throat. When the pressure on the wattles was removed, they filled out again. Puncture of the wattles and multiple incisions into the skin of the neck and head completely removed the condition. It became clear that the wattles are hollow sacs usually completely closed and that the surgical interference had created a communication between them and some part of the respiratory system, throat, bronchi, or air sacs. Commonly as a result of fighting these hollow wattles become distended with blood, which, coagulated, has to be shelled out.

This case seems to provide a clue to the mechanism by which the turkey cock erects his head appendages and exhibits such a remarkable display of skin colour. It would appear that the head furnishings of the turkey are like the wattles of the fowl, hollow thin walled sacs, and that they normally communicate with some part of the respiratory system. If at some point in this communicating passage there is erectile tissue, which, in response to the stimulus of emotion, can become turgescent, this may act in such a way as to permit air to enter the appendages but not to leave them. The red colouration of certain parts is thus probably due to the obliteration by pressure of the thinner walled superficial veins and the blue to the local accumulation of venous blood in dammed lacunæ.

Notices

An exhibition of great interest to scientists is at present being held in Dusseldorf. Doctors, veterinary surgeons, chemists and biologists will be able to spend very profitable days there. Hygiene, social welfare, sport, all have their sections, and housing and tuberculosis are completely dealt with.

German naturalists and medical men hold a meeting there from September 19th to 26th. Lectures are given in three groups: (1) Science and technics; (2) Combating vermin and damages caused by them; (3) Relations between the medical and natural sciences.

The exhibition closes in October.

Returns issued by the British Ministry of Agriculture for the present year show that for the 5th year in succession, the number of Cattle have increased, and the total this year, 6,252,400, is the largest ever recorded; of these, 2,748,900 are Cows or Heifers in milk. There are 884,000 more sheep in the Country than there were when statistics were taken in June, 1925, and there are now only 2½% of sheep less in the Country than there were in 1914. On the other hand, pigs have declined in numbers to 2,200,000, and horses are less by 3,900 than there were in 1925; there being only approximately 1,128,700 of the latter in the Country. This information cannot but interest the members of our Profession, and particularly those who are just commencing their careers.